DOCUMENT RESUME

ED 210 980 HE 014 581

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TITLE The Reform of Studies and the State of Research in Higher Education. Intergovernmental Conference on Policies for Higher Education in the 80s (Paris, France, October 12-14, 1981).
INSTITUTION Organisation for Economic Cooperation and Development, Paris (France).
REPORT NO OECD-06293
PUB DATE Oct 81
NOTE 46p.; Not available in paper copy due to marginal legibility of original document.
AVAILABLE FROM Organisation for Economic Co-Operation and Development, Chateau de la Muette, 2, rue Andre-Pascal, 75775 Paris Cedex 16, France.

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Comparative Education; *Educational Change; Educational Policy; *Education Work Relationship; Foreign Countries; *Higher Education; Humanities; *Relevance (Education); *Research Needs; Research Projects; Retrenchment; Social Sciences; *Undergraduate Study; Vocational Education
IDENTIFIERS Europe

ABSTRACT

The importance of reform of studies to ensure greater social and professional relevance of higher education in countries that are members of the Organisation for Economic Co-operation and Development (OECD) is considered. The state of research in higher education is also examined. After briefly discussing the current state of higher education in OECD countries and the relationship between higher education and working life, the reform of studies, and the particular problems of the humanities and social sciences, are examined. In most OECD countries, higher education is currently on the defensive because of such factors as economic recession, demographic changes, and graduate unemployment. It is suggested that higher education can respond to a greater emphasis on working life in five main ways: the alternative choices of work and study, either before, during, or after studies, can be encouraged; vocational representatives can be involved in the planning or accreditation of courses; student enrollment vocational courses can be increased, and the numbers in nonvocational courses can be decreased; a compromise, such as requiring students in academic courses to spend 20 percent of their time in vocational studies can be implemented; and academic and vocational needs can be subsumed within a framework of general undergraduate education, educational policy (and demographic factors) and by science and technology policy. The way in which external funds for research projects are distributed and the consequences of decline are considered. (SW)

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POLICIES FOR HIGHER EDUCATION IN THE 80s

Intergovernmental Conference

12th-14th October 1981

The reform of studies and the state of research in higher education

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PARIS 1981

ORGANISATION FOR ECONOMIC
CO-OPERATION AND DEVELOPMENT

GENERAL DISTRIBUTION
Paris, September 1981

THE REFORM OF STUDIES

AND THE STATE OF RESEARCH IN HIGHER EDUCATION

The present report has been prepared under the Education Committee programme on Policies for Higher Education. Part I (The Reform of Studies in Higher Education) has been written by Geoffrey Squires, and Part II (The State of Research in Higher Education), by Stuart Blume, in their capacity as consultants to the Secretariat.

The report is circulated for reference and information.

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PART I

THE REFORM OF STUDIES IN HIGHER EDUCATION

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I. INTRODUCTION

The relationship between higher education and working life is currently a major concern in most OECD countries: hence its choice as one of the four main themes of the Intergovernmental Conference on Policies for Higher Education in the Eighties. At its simplest, this concern arises out of imbalances in the supply of and demand for graduates. Such imbalances might logically be remedied either by modifying supply, or modifying demand, or both. This paper is devoted to the first of these alternatives, that is modifying the supply or output of graduates. The second, and equally important alternative - modifying the demand for graduates, and the way in which they are absorbed into the job market - is only mentioned here in passing, since it is the subject of other, complementary conference papers.

The supply of graduates can, in turn, be altered in two ways: either quantitatively, by increasing or decreasing the numbers of graduates; or qualitatively, by altering the education or formation that these graduates receive. The paper considers both of these strategies, but places more emphasis on the second, i.e. the reform of studies. In this, the paper follows the guidance of the Advisory Group for the Conference, which stressed "the importance of qualitative reforms in attempts to ensure greater social and professional relevance of higher education. In this connection it was agreed that the Working Group should pay particular attention to certain trends and issues within the broad area of content and organisation of studies(1)."

The paper is divided into five sections. In the first two, it attempts to place the discussion in its wider context by examining, necessarily briefly, the current state of higher education in Member countries, and the relationship between higher education and working life. There follow two more detailed sections on the reform of studies, and the particular problems of the humanities and social sciences. There is a brief concluding section on the major policy issues and options which emerge. In concentrating more on the humanities and social sciences than on other faculties, the paper is again following the directions of the Advisory Group(2). These two faculties have been chosen, not because they are intrinsically different or especially important, but because certain problems which may arise in all faculties seem likely to occur in a more acute form in them, for a variety of reasons.

This paper draws on, and attempts to synthesise a number of papers and discussions which have examined trends and problems in the reform of studies in several countries(3). The views expressed here, however, remain the sole responsibility of the author, and readers are urged to consult the various country papers, where available, for accounts of national developments. It should also be pointed out that many OECD Member countries were not represented in this particular study, and hence the conclusions reached here may only have a limited and localised validity.

Finally, a note on definitions. Higher education in this paper is taken to include both university and non-university studies of and leading up to, first degree level. The phrase "leading up to" is, of course, problematic, since the structure of studies in many countries has become so disaggregated, through modular credit schemes, that it is often difficult to know whether a particular student is aiming eventually at a degree, or is simply studying a single, "separate" course as an end in itself (the student himself may not know, either). In the event, the paper will be found to concentrate rather more on the university than the non-university sector, for reasons which will become apparent. The phrase working life - is intentionally broad, and certainly broader than the term employment. How broad, we shall discuss in section III: for the moment, it is enough to note that it goes beyond one specific job, to include changes within jobs, changes between jobs, job satisfaction, and the relationship between employment and other major aspects of adult life(4).

II. THE CURRENT STATE OF HIGHER EDUCATION

In the majority of OECD Member countries today, higher education is on the defensive. The extent of this defensiveness varies, of course, from country to country. At best, it means an end to the long and unprecedented period of expansion which in most countries began in the early 1960s: at worst, there is rationalisation and contraction, leading to closure of departments and institutions, and redundancies among academic staff. In the majority of countries, higher education policies are undergoing major review.

The reasons for this state of affairs also vary, and vary in importance from country to country. However, if we set aside, temporarily, uniquely national factors, four main causes can be identified.

First, economic. The world recession has reduced the amount that governments feel they can spend on higher education. Whatever the intrinsic merits or justifications of a particular system, government may decide quite simply that it costs "more than the country can afford" in the present economic climate. (And the government's decision may be paralleled by the decisions of individual students.) Secondly, demographic factors in some countries point to an actual or imminent decline in the mainstream intake of school leavers. Thirdly, graduate unemployment is now a serious problem in certain countries, and this suggests to some policy-makers an over-production of graduates which should be cut back. Fourthly, there exists, in some countries at least, a vague but nonetheless important feeling that higher education "over-expanded" in these last twenty years, leading to either a surfeit of graduates or a decline in standards, or both. This feeling can be found in both some policy-making circles and in general public opinion; in the latter case, it may also include a delayed reaction to the student "troubles" of the 1960s and 1970s.

The extent to which higher education is on the defensive in any particular country is largely a matter of strength, and concurrence, of these four factors. Where all four operate together powerfully, higher education is indeed "against the wall". More often, however, it appears that some factors operate, but not others, e.g. that public spending is being cut, but that graduate unemployment is not a major problem: or that public spending is being cut, but the demographic curve is actually rising. (This can create different, though just as serious, problems.)

The interpretation of the situation, and the four factors mentioned, is, of course, open to question. However, what concerns us here is not so much the causes of this "crisis", but reactions to it. Given the four factors listed above - recession, demographic downturn, graduate unemployment, and apparent over-expansion - it is tempting to interpret the current crisis in higher education as primarily a proolem of size, and to argue therefore that the solution lies in cutting back on funding, resources, and numbers. And clearly, the absolute size of the system is important, and must be expected to reflect changes in the major variables which bear on higher education. The system does not exist in an economic or demographic vacuum.

In the medium and longer term, however, there are reasons for thinking that the type and flexibility of the higher education system are more important than its sheer size. By type here, we mean primarily the nature of the output of graduates: what they have studied, to what level, and how generalist or specialised they are. By flexibility, we mean the ability of the system to initiate or respond to changes in four major aspects of its environment: changes in research priorities; changes in knowledge and the structure of knowledge: changes in student demand: and changes in the graduate employment market.

There is, perhaps, a danger that the undifferentiated expansion of the 1960s will now be parallelled by an undifferentiated contraction in the 1980s: whereas in both cases, more concern with the type or output of the system, as distinct from mere numbers, would have been (and would be) beneficial. But how far was the expansion of the 1960s undifferentiated? Certainly, in a number of countries, there were attempts to influence the type or balance of the system, as well as to encourage its growth. These attempts often took the form of setting up short-cycle institutions outside the main university sector, such as the IUTs in France, Regional Colleges in Norway and Yugoslavia, Polytechnics in the United Kingdom, Colleges of Advanced Education in Australia, Community Colleges in the United States and Canada. And it is also true that in some countries - France and Sweden in particular - very deliberate attempts were made to formulate general policies for higher education which would alter the type or balance of the system.

However, with hindsight, the 1960s and early 1970s still appear as a period above all of expansion, with "diversification" coming a poor second. Higher education grew rapidly, and enormously, and primarily on the basis of student demand. This demand was conceptualised largely in types of rights: existing, statutory rights in some continental countries, but increasingly also in other countries, moral rights. "The right to higher education" became a central element in major reports on higher education in English-speaking countries during the period. It is true that in the United Kingdom the Robbins Committee tied such rights to a broadening of the undergraduate curriculum, but that condition was largely ignored. The argument for expansion based on student rights was also supported, or at least not contradicted, by the suggestion that more higher education somehow contributes to general economic growth, in ways which were, and remain, difficult to specify.

In retrospect, student demand, or the right to higher education, seems an incomplete or imbalanced basis on which to build and sustain the system. Higher education may indeed be, or be thought of, as a right· but that right has to compete with other, equally defensible rights: the right of school leavers to apprenticeship or vocational training· the right of adults to continuing education; the right of parents to pre-school nurseries for their children; and so on, not to mention social or welfare rights outside the educational domain altogether.

The only secure, long-term basis for justifying a system of higher education must involve not only the concept of student demands and rights (which equally should not be ignored) but also the needs of the knowledge professions, as expressed through research priorities, and the needs of employers and of the society at large. And a consideration of all these needs has implications not only for how many students there are, but for what they study.

III. HIGHER EDUCATION AND WORKING LIFE

The Swedish contribution to this study conceptualises the situation in terms of the need for "balance":

> "The problems in the eighties can be expressed as a number of 'balancing acts', in particular
>
> - between different groups of students/generations;
>
> - between degree studies and shorter programmes or separate courses;
>
> - between a traditional subject oriented, general or liberal education, and more vocationally oriented content(5)."

The third of these points suggests that vocational criteria must be brought into the planning of courses, not o

the exclusion of general academic criteria, but in order to balance them. But what is implied by vocational criteria nowadays? What does it mean to relate higher education to working life?

One can begin by asking what it is that employers look for in their graduate applicants. Clearly, the specifications and expectations vary greatly from job to job, but it has been suggested that the following four criteria are nearly always present(6):

1. A generally high level of intelligence, capable of being deployed in various directions; the ability to think analytically and critically.

2. Personal qualities, such as motivation, commitment to the job, initiative, willingness to exercise judgement and take responsibility; the ability to order priorities and to make decisions within a limited time: and an element of self-knowledge.

3. The ability to relate to and work with (i) superiors, (ii) colleagues and peers, (iii) those in their charge, (iv) the general public (in some cases).

4. Expertise and/or trainability.

The distinction between specialist and generalist intake can be seen in terms of the different emphasis placed on these criteria. With specialists, it is expertise which is all important: with generalists, the criteria are likely to be much more evenly balanced. But even with specialists - for example, doctors, engineers, pharmacists - the other criteria cannot be altogher ignored, and although they may not figure particularly at initial selection, they will doubtless affect the graduate's subsequent career.

What do these criteria imply for the content of higher education? First, it is worth noting that two of the criteria - personal qualities, and the ability to work with other people - are not academic at all, and relate rather to "personality" or "mature". These, in turn, are likely to be influenced not so much by the content of courses, but the relationship between education and other experience. Has the graduate spent all his time studying within the institution, or was work experience an essential part of the course, perhaps of a "sandwich" course? If it was not a sandwich course, did the graduate gain any other experience of working environments, either before or during his studies? What kinds of extra-curricular interests and responsibilities did he have? And so on. In some ways, the relatively enclosed and atypical environment of higher education may actually misfit graduates for other kinds of employment: a point which may benefit the mature job applicant, and to some extent counteract the disadvantage of age.

The other two criteria - general intelligence and expertise/trainability - do relate to the content of studies. Here, differences in national tradition are important. It appears that in the English-speaking countries, a good deal of emphasis is placed on the assumed general-purpose intelligence of the graduate, and differences in graduate unemployment rates reflect differences in the perceived selectivity and status of institutions at least as much as differences between subjects. It matters a great deal where one got one's degree, and what class of degree, as well as what one studied. In continental Europe, more emphasis seems to be placed on the expertise of the graduate, i.e. what subject(s) he or she studied. These differences between the continent and the English-speaking world - necessarily over-simplified - reflect differences of assumption about the transfer of learning, in psychological terms, and job substitution, in employment terms. The English emphasis on the "first-class mind" who can turn his or her attention to almost anything, contrasts strongly with the French tradition of high-level, professional training in the grandes écoles: and this difference of emphasis at the peak of the system also affects the relationship between higher education and employment at lower levels.

However, the phrase working life goes beyond what any one employer may look for in a graduate at any one time: and it certainly goes beyond first employment. Particularly in relation to higher education, the phrase working life implies a much broader scope and concern than the more familiar, traditional term "vocational". There are three aspects to this greater breadth.

First, occupational. The proportion of jobs which remain largely unchanged over a working life of, say, forty years is, one would guess, small and declining; although one can overplay the uniquity of "change". Nevertheless, modern industrial societies are unique in the extent to which they have institutionalised innovation in their modes of production, and this "productive" innovation tends to stimulate innovation in social institutions and relationships as well, although the process is by no means always linear, or simple. Moreover, mobility between jobs, as distinct from innovation within them is another characteristic, though less common feature of industrialised societies. Again, one must not over-emphasize the extent to which this happens: many people still spend their entire working lives doing the same, or very similar jobs. However, graduates and others with high-level qualifications are perhaps more likely to move around in the job market than the average unskilled or semi-skilled worker.

Innovation within jobs creates a need for "refresher" courses; and mobility between jobs creates a need for re-training. Thus it would seem necessary for the post-school education system to provide for both of these, though whether they will always fall under the heading of higher education is another matter. In addition, however, prospective job innovation and mobility have implications for the initial education and formation that students receive. They suggest an

emphasis on trainability, adaptability and flexibility. This is partly a cognitive matter; an emphasis in the course content on basic processes and principles as well as defined competencies; on transfer of learning as well as specific applications. But it is also partly a matter of attitudes and expectations; subtle matters influenced as much by the attitudes of the teacher "model" and the views aired in discussion as by any defined content.

Secondly, working life goes beyond the narrowly vocational in its social aspect. Most work is done in groups, and is affected by, and in turn affects other groups. It is carried on in factories, offices, departments: and both employees and employers tend to be organised in groups. More broadly still every unit of work is part of, and interacts with, the rest of the economy, either through planning or market mechanisms, or a mixture of the two; and economy and society interpenetrate.

All this is obvious, and yet the obvious implications for vocational education have not always been drawn: the social context of a job has often been considered to lie outside the normal scope of training: indeed, to be something of a waste of time. And yet it is very difficult to abstract economy from society, both at the macro-level, and at the micro level of the individual's job. This is a question, of course, on which there are profound differences in political philosophy and political economy; but at the very least, most people would agree that social relationships within the work group affect job performance and productivity. This suggests that at least a minimal attention to the social aspects of jobs and work should form part of the initial education and training for a job: and indeed this is already the case in many medical, legal and engineering courses in, for example, the United Kingdom and the United States.

Thirdly, working life goes beyond the narrowly vocational in its personal aspect. Again, this is something that it often left out of vocational courses: indeed, it may be considered an invasion of privacy. But one has only to consider the personal aspects of unemployment for the personal aspects of employment to come into prominence. A person who loses a job loses not only an income, but a role, and a set of daily routines. This may affect not only his or her self-concept, but relationships as well: it alters, for example, the pattern of family life. Industrial psychologists have talked for some years about "job satisfaction" and "career development", and for most professional or semi-professional people their job provides not only a day-to-day role, but also a sense of development, or at least continuity, over a longer time span: not to mention "workaholics".

All these again rather obvious considerations have been suddenly made much more urgent by the possibility that we are facing not only cyclic unemployment, related to the level of economic activity, but structural unemployment. Structural

unemployment is a rather loose concept, but it implies that certain jobs are actually disappearing altogether, rather than being merely in temporary abeyance, due to factors such as labour-saving technology, and competition from low-wage semi-industrialised countries. Whether these disappearing jobs will be compensated for by new, as yet unforeseen employment opportunities, is an open question. If they are not, we are faced with the possibility that either some people will never work (or only periodically) or that we will have to share out work (as distinct from sharing out the wealth created by work).

There thus seems to be a strong case for including some consideration of the role and self-concept functions of work in any preparation for working life. In societies which are, at least in this aspect, less authoritarian than they used to be, we cannot ignore concepts such as job satisfaction and career development for those who are in work; and we cannot ignore the identity problems of those who are out of work.

We have suggested that the phrase working life goes beyond a narrow interpretation of vocational education in three ways: occupational, social and personal. Clearly, one must not spend so much time on the peripheries that one does not adequately deal with the centre, and a concern with the above aspects of preparation for working life must be relative to the essential core of knowledge and skills involved. The main vocational priority must always be an adequate preparation for the content of the job. However, enough has been said to demonstrate that a concern with working life need not be quite as narrow or narrowing as has traditionally been feared by some academics and that therefore the problem of striking a balance between "the traditional subject oriented, general or liberal education, and more vocationally oriented content" may not be quite as intractable as it appears at first sight. The social and personal aspects of work lead easily and naturally out towards some of the concepts and themes which are part of the discourse of the humanities and social sciences: and the need for adaptability and transfer of learning may push one back towards more basic scientific principles than might otherwise be thought necessary.

There are still real conflicts, in course planning, which spring from the irreductible plurality of aims and functions in higher education. However, we shall explore in the next section a number of ways in which it may be possible to take greater account of the vocational function of higher education without denying or submerging its other important functions, such as the advancement of knowledge, or the provision of general education. In doing so, we shall draw on examples primarily from countries involved in this particular study.

IV. REFORM OF STUDIES

Broadly speaking, there are two ways in which higher education institutions and systems can respond to the need for greater vocational relevance: first, by changing the numbers of students doing particular courses and secondly by changing the courses themselves.

We are primarily concerned in this paper with the second of these responses, i.e. changes in the courses themselves or reforms of studies, but before we examine such changes in more detail, it is necessary to say something about the first, quantitative, response. In simple terms, this means ensuring that more students do courses which have reasonable job prospects, and fewer do courses which either have no obvious vocational connection or lead on to occupations which are already oversubscribed. This shift can occur at the level of individual courses, of institutions, and even of sectors of education. It can mean more students studying social administration, and fewer doing anthropology: more doing technology, and fewer doing humanities: more in the non-university sector, and fewer in the universities. Such shifts in the proportions of students - both at intake, and on graduation - can come about as a result of educational planning, or shifts in demand, or a mixture of the two. In the United Kingdom, for example, students entering higher education in the 1970s seem to have responded in some cases to market information about job opportunities and job saturation: and it is easy to see that the planned and emphatic provision of such information could systematically influence student demand, even though this falls short of a planned regulation of demand. In other countries, demand for places in some subjects is quite clearly controlled through a numerus clausus.

These quantitative solutions to the problem of vocational relevance have a good deal to recommend them. From the government point of view, it is generally much easier to influence numbers in higher education than it is to influence content: indeed, the latter raises some very thorny questions. Resources can be shifted away from some institutions, e.g. traditional institutions, and towards others, e.g. short-cycle, vocational institutions. Particular subjects, which promise long-term employment opportunities and economic development - such as information science or biotechnology can be blessed with research grants, while others are left to atrophy. If employers despair of reforming the traditional universities, as they seem to do in some continental countries(7), they can simply by-pass them, and concentrate on the newer, and more amenable short-cycle institutions, recruiting directly from them, and building up a close liaison as regards course planning. And such institutions are perhaps better geared also to providing not only initial formation, but mid-career re-cycling. For the man who has been made redundant in his forties, or the "empty nest" woman in her thirties, an intensive full-time one year vocational course may be a more viable plan of action than a general university degree, which will take at least three or four years full-time, and six or seven part-time. Adults will often make sacrifices and take risks for something which lasts a year, even to the extent of living away from home: but the prospect of doing this for not one, but several years, is a different matter. The intensive one-year vocational course for adults is in some ways the antithesis of the kind of part-time degree which the British Open University provides, and which other universities in the United Kingdom are increasingly beginning to offer.

There are, however, problems with a purely quantitative solution to the need for vocational relevance. These stem mainly from the two facts: first, that vocational needs keep changing; and secondly, that there is a time-lag built into the response. There are perhaps certain sectors of employment where it is possible to give a reasonably accurate forecast of manpower needs: medicine and teaching, for example. However, there appear to be national differences in attitudes towards manpower planning; British scepticism (based on unhappy experiences with precisely the above two sectors) contrasts with relative Danish optimism. And some employment sectors are much more sensitive to economic cycles than others. However, a more serious problem is the time lag between the identification of future manpower needs, and the supply of appropriate graduates. When one counts in the necessary choices made at upper secondary level, and some post-graduate apprenticeship or orientation, one is talking of a delay of at least six, and more often nearer ten years. Ten years may not seem a long time, but one has only to look back at the reports of the last major OECD conference on higher education in 1973 to be struck by the magnitude of the changes since then. There is thus a danger that both governments and individual students may respond to perceived future needs, which by the time they get there, will have altered dramatically. It is possible, for example, that the current popularity of law and accountancy as undergraduate subjects in the United Kingdom will create a glut of graduates by the time many current students have finished their studies.

Quantitative remedies to the vocational problem also create imbalances in the higher education system, particularly in staffing, which may persist well after demand for these subjects has declined again. This is one aspect of the need for flexibility in higher education mentioned in section two of this paper. In some countries, we are now seeing precisely this problem as a consequence of the disproportionate expansion of the social sciences in the 1960s and 1970s. Such departments are very well staffed at a time when social science graduates face rising unemployment. Should institutions continue to produce unemployable graduates in large numbers? Or should they make social science lecturers redundant? Neither alternative is pleasant.

Thus while quantitative solutions to the vocational problem are likely to play a part in adjusting higher education systems to new conditions, these solutions in turn can create other problems: failures of forecasting, time-lag problems, imbalances and distortions within the higher education system. For these reasons, if for no others, it is worth looking at the possibilities for qualitative reforms, i.e. changing the courses themselves, as distinct from changing the distribution of students.

We shall examine briefly four approaches to qualitative reforms: (1) planned alternation of work and study; (2) involvement of vocational representatives in course

planning; (3) the balancing of the academic and the vocational: (4) and the reconciling of the academic and the vocational. The last two will be explored in more detail in the next section of this paper, in relation to the humanities and social sciences.

Planned alternation of work and study can take various forms: work experience between school and higher education; work experience during higher education in sandwich courses, or career "pre-experience" placements; or the dovetailing of study and work for a year or so after graduation; and in-service professional continuing education. The "year between" school and higher education is now a fairly common phenomenon in the United Kingdom, though in a period of high unemployment it is not easy to find work to do in that year. Sandwich courses, also a standard though declining feature of courses in the technological universities and the polytechnics in the United Kingdom, originated in Germany, and belong to that country's strong tradition of technical-vocational education. The dovetailing of post-graduate study and work is common in some subjects - medicine and teaching, for example - in many countries, and is a feature of the successful "teaching companies" scheme in the United Kingdom(8). In-service professional education, variously described as "post-experience" or "continuing", has developed markedly in the United States, France, Germany and Sweden in recent years, in some cases based on formal schemes for Paid Educational Leave.

The alternation of work and study is a central feature of the concept of recurrent education, and at least in its vocational aspect, was generally endorsed by a recent OECD meeting of management and trade union experts(9). And apart from any effect it might have by way of making the studies more applied and relevant, it might also help to develop both the personal qualities and ability to work with people which, we have suggested, are typically selection criteria for jobs.

Should the connection, therefore, be hardened? Should work experience be an admission requirement for higher education? Should all courses contain some compulsory experience of outside working environments? Work experience is already formally counted as an admission factor in Sweden, but with the present levels of unemployment in many countries, to insist on it would be to condemn university applicants to a year of doing nothing. This does not preclude measures which would weight admissions more on the side of work experience: "points" given for it, student grants and loans related to it. Equally, a compulsory element of work experience during courses is likely to be less effective (and could produce some absurdities) than measures which enable students to study part-time, or interrupt their studies for a year or so if they need or wish to. Facilities for part-time study, therefore, and modular credit schemes, which allow the student to alternate, are to be welcomed, if closer links between work and study are considered important.

In this connection, it is worth noting that the number of students who study part-time and work part-time has increased sharply in a number of countries (e.g. France, Italy) in recent years. This largely unplanned development can be seen as a response to uncertainty: uncertainty about the job market, and about the value of a degree. Such students are "hedging their bets" as regards higher education and employment, and reduce their commitment to higher education to the minimum necessary to continue their courses. It is difficult, however, to see this tactic as a "link" between education and employment.

A further aspect of this link is the active placement of graduates in short-term employment. In Denmark, a centrally administered scheme has been running for several years:

> "It takes the form of a remuneration to firms or organisations which take on groups of unemployed graduates to work on a well-defined project for a limited period of time. The State pays what corresponds to unemployment benefits so that wage expenses by the firm are limited to the difference between unemployment benefit and statutory wages. The short-term effect is to procure employment for some hundreds of graduates, but the more important aim is to prove to employers that they can profitably employ graduates - including such categories as they are not familiar with. The scheme has been an acclaimed success(10)."

A second approach to the qualitative reform of studies is the involvement of vocational representatives in course, or indeed institutional planning. This practice has been common with the organised professions for some years: representatives of the medical, legal, pharmaceutical and social work professions have typically influenced the planning and assessment of courses, usually through centralised requirements, need to obtain professional status or to gain exemption from professional examinations. However, what is being discussed here goes further than the clearly professional subjects, and implies less centralised involvement. In Sweden, for example:

> "The Higher Education Reform of 1977 changed the structure of authority in important respects. At the same time as decision-making concerning many issues has been decentralised, representatives of public or occupational interests have become members not only of boards at the national and regional levels but also members of the boards of the different institutions and of their programme committees (bodies responsible for the planning and content of the educational programmes). This creates a situation where values other than internal academic ones will be expressed, when balancing issues of different kinds are on the agenda(11)."

Similar developments have taken place, and are under consideration, in the Federal German Republic, and to a varying degree, in a number of other countries. In Germany, the Hochschulrahmengesetz law of 1976 laid down a general policy framework for higher education and gave all tertiary institutions the common aim, among other things, of preparing their students for occupations requiring the use of scientific knowledge or scientific methods. ("Scientific" here includes subjects which in English-speaking countries would be regarded as systematic or scholarly rather than scientific.) The task of reshaping the content of higher education, however, falls to various commissions both across and within Länder; such commissions include representatives from government, higher education (professors, lecturers, students) and also employers and employee's associations. So far, a number of these commissions have been established, particularly in North Rhine Westphalia and Lower Saxony. One of the key aims of curricular reform is to enable students to adapt to new problems and occupations, and this implies more emphasis on the application of knowledge than has been traditionally the case in German higher education. Much depends on the educational traditions of the country concerned. In most countries, the involvement of professional bodies in the planning, or more usually, accreditation of courses, is normal and acceptable. In other countries, universities have lay (i.e. non-university) representation at the highest levels, but in some cases this is simply a token, a relic of the days when local interests - and local money - were of greater importance than they are in our increasingly state-funded systems. In fact, the growing "étatisation" of higher education, which accompanied its expansion in many countries, has caused a relative decline in the influence of local or lay bodies, and has meant that such influence has now to be deliberately planned into the system, as it is in Sweden.

The potential for conflict in these situations is clear: there are outsiders suggesting to professional academics not simply how their graduates might be absorbed into the job market, but what and how they should teach. The fundamental contrast between the "autonomous" and "service" traditions of higher education is bared. Yet if the conflict is not recognised and at least partially resolved at this level, it will simply be transplanted to the much larger, and less manageable, level of the relationship between higher education as a whole, and the society as a whole. At that level, higher education arguably becomes much more vulnerable to shifts in government policy, employment demand, and public opinion, than if negotiations and adjustments took place in a multitude of smaller forums.

We have suggested that there are two other approaches to the reform of studies: attempts to balance the academic and the vocational; and attempts to reconcile them. Since both of these concern the humanities and social sciences particularly, we shall discuss them in more detail in the next section, and only introduce the broad areas here. By balancing the academic

and the vocational, we mean including some vocational elements in an otherwise academic course (or vice versa). For example, a student whose main subject is literature or anthropology might nevertheless also take some shorter course in say, computing, or a foreign language, or business studies. He would thus spend, say 80 per cent of his total university time on his "academic" subject, and 20 per cent on the vocational courses. And everyone would be quite clear that the aims of the two were quite distinct: the first would provide his academic or general education, the second some vocational competencies. (In British further education, conversely, technical and business students are required to spend a small proportion of their time on liberal/general studies.)

The idea of reconciling the academic and the vocational is much more problematic. It suggests a single form of higher education which concurrently provides a general, academic worthy of the name and yet prepares the graduate for employment, or to use the broader phrase, working life. We shall explore this notion in more detail in the next section, but suffice to say, that whereas the idea of balance simply involves the pragmatic recognition of the need to compromise, the idea of reconciliation involves showing, somehow, that the academic can be vocational, and the vocational academic.

In this section we have discussed briefly the quantitative responses to the need for vocational relevance, and then four approaches to qualitative reforms: alternation between work and study; vocational representation in course planning and accreditation; the balancing of the academic and the vocational: and the reconciling of the academic and the vocational. Quantitative responses tend to "solve" the problem of the humanities and social sciences simply by taking students away from them and putting them into more vocational lines. For the system as a whole, this may be a solution, but for the humanities and social sciences it is a non-solution leading to declining morale, and ultimately the run down of departments and perhaps redundancy of staff. The long-term effect of this on research and development in those fields of study could well be serious. We shall concentrate therefore on the possibility of qualitative reforms, and in particular on the last two policy options: balance and reconciliation.

V. THE HUMANITIES AND SOCIAL SCIENCES: A SPECIAL CASE?

Why are the humanities and social sciences especially vulnerable to any call for greater vocational and professional relevance in higher education? Why are they a special case? Are they indeed a special case? It was said at the beginning of this paper that these two faculties had been selected for special attention not because of some a priori judgement, but because the problems which seemed likely to occur in all faculties were likely to occur more severely in the humanities and social sciences. The difference is therefore one of degree, rather than kind and it is important to bear this in mind in the discussion that follows.

The most obvious reason why the humanities and social sciences are especially vulnerable is that they are not obviously vocational: or, at least, some of the subjects in them are not. One has to analyse the problem subject by subject: and there are differences between countries to take into account as well. Whereas in the United Kingdom political science graduates have no particular employment niche, in Denmark they frequently go into public administration. Law in most countries is a multi-purpose vocational degree; but in some countries is classified outside the social sciences. Economics, likewise, opens up vocational options both in the public and private sectors, but is nevertheless a fairly common degree in Greece.

However, the problem of unemployment among humanities and social science graduates has arisen not because there is no market for such graduates, but because their traditional markets - teaching and public service - are disappearing, at least for the moment. For demographic reasons, teacher intake has fallen sharply in many countries, and for economic reasons, public services are being cut back. These two sectors in the 1960s and 1970s absorbed much of the general output of humanities and social science faculties, and it is not at all certain that private industry will be able to absorb them instead, even with a lowering or re-orientation of graduates' expectations(12).

Another factor which makes the social sciences, in particular, vulnerable is that they expanded disproportionately in the 1960s and 1970s. In 19 OECD countries the annual growth rate of graduates, averaged across all fields of study, was 9 per cent between 1965 and approximately 1973. The figure for the humanities was 8.4 per cent; whereas the figure for the social sciences was 12 per cent(13). In the same period, entrants to the humanities increased in 6 OECD countries and decreased in 9; whereas entrants to the social sciences increased in twelve countries and decreased in only three. Admittedly the 1965 base-line in some social science subjects was low.

This disproportionate expansion occured partly because of student demand, and partly because the humanities and social sciences were used as safety valves for expansion in some countries, thus allowing intake to other faculties to remain controlled. In addition, in Germany and elsewhere, students used these faculties to "park" in while they waited for admission to other, more selective faculties. The net result of this disproportionate expansion was, at best, to leave such faculties producing high numbers of increasingly unemployable graduates, and in the worst cases, to create chronic problems of over-crowding and disorganisation.

These two factors - vocational irrelevance and disproportionate expansion - might not be so bad if the humanities and social sciences had the academic standing to protect their own interests, but in some cases they clearly do

not. We can define academic standing as the ability to attract or protect resources in competition with other academic departments, as evidenced primarily by staff student ratios and research income. The standing of particular subjects varies from country to country, but in general the humanities and social sciences, particularly in continental Europe, were not very successful at protecting their interests during the expansionary period from 1960 to 1975; hence, one would expect them to be even less successful in a period of contraction. In the United States, the fate of a number of small liberal arts colleges points to the same conclusion, and in the United Kingdom the Colleges/Institutes of Higher Education look like coming under very heavy pressure in the next few years.

The future of the humanities and social sciences thus does not appear very hopeful. They are open to two of the four general charges currently being laid against higher education - vocational irrelevance, and over-expansion - although many would dispute the justice of both of these. They are also often regarded as providing the elastic part in the system, which can expand or contract at will, leaving the other faculties unchanged. They are associated with the student agitations in the late 1960s and early 1970s, which has probably cost them some public sympathy. And they are used, in some countries, by students "parking" in the universities. How do they, or can they respond to this situation?

One response is to alter the proportions of students studying subjects within each faculty in favour of the more obviously vocational subjects: fewer students doing philosophy, literature, history, fine art, and more doing languages, area studies, journalism, design; fewer students enrolled on sociology, politics and anthropology courses, and more on social administration, law and (perhaps) psychology. Such shifts in proportion occur in any case, although not always predictably, because of shifts in student demand. But while this redistribution within faculties may strengthen the position of the faculty as a whole, it soon divides subjects into "strong" and "weak". One way around that problem is to introduce an element of compulsory, general studies - i.e. a general first year - which involves all subjects. Modular schemes, in which subjects are sub-divided into course topics, can also even out demand for different subjects, though this does not necessarily happen.

Another response to pressure is to attract increasing numbers of mature students, sometimes to fill the places left by a declining demand from school-leavers. Mature student entry, and part-time study, are more common in the humanities and social sciences than in other faculties, for a variety of reasons: the subjects can be studied at a distance; life experience is a useful contribution to the understanding of some of them; they typically employ ordinary language rather than specialised codes; they lend themselves to modularisation. And some mature students at least are already in employment, and are therefore less interested in the vocational potential of the subject.

For these reasons, the humanities and social sciences lie at a natural intersection between higher and adult/continuing education. There are both benefits and drawbacks to this. A strong demand from mature students obviously strengthens these faculties' position, and puts them in the vanguard of any movement towards recurrent education. However, adult/continuing education has typically been a much lower educational priority than higher education in government policy terms, and there is perhaps some danger that if these faculties go too far down the mature student road, they will marginalise their own position within higher education. In other words, they will be increasingly assigned, informally or formally, to the continuing education sector, leaving higher education to those faculties which fulfil more obvious manpower needs.

The implication of the preceding paragraphs is that the solution to the "problem" of the humanities and social sciences does not lie wholly within those faculties: it must be cross faculty. This indeed is the issue raised by the Swedish paper:

> ". . .the main problem in the 1980s, as well as in the 1970s and perhaps in the 1960s is the same - that is: what is the role of the humanities and social sciences within the system of higher education(14)."

Implicit in this question is the further question: how do the humanities and social sciences relate to <u>other</u> faculties? We have suggested two possible relationships, one based on the pragmatic need to balance, or compromise between academic and vocational needs, and the other attempting a more ambitious reconciliation of the two. We shall devote the remainder of this paper to exploring these alternatives.

The Swedish contribution to this study gives some clear examples of attempts to balance academic studies with some vocational preparation:

> ". . . measures were taken to improve the vocational approach of the university training - the creation of special courses, which were to be vocationally oriented towards a special part of the labour market. Examples of such courses are Public Health Administration, Administrative Technique, Labour Market Relations, International Relations and Transport Administration. These courses were partly directed towards students in the humanities and social sciences who were in the last phase of their studies, and aimed at giving them somewhat of a vocational "touch" before entering the labour market(15)."

This kind of approach involves a balance or compromise between the academic and the vocational allocation of time: no attempt is made to relate the vocational "touch" to the major field of study. The scheme is thus fairly straightforward to operate, and the main questions which arise are practical:

- what proportion of time should be devoted to vocational studies?

- when should they come? in the first year, middle years, or final year?

- what directions or sectors of the labour market should they point towards?

The answers to these questions depend so much on national and local circumstances that it would be pointless to try to be specific here. Clearly, the vocational element must be reasonably substantial to be of any use: but whether that implies 10 per cent or 30 per cent of the total survey time is a matter for discussion. As regards the timing of such studies, in the Swedish case they come at the end, but one can also see arguments in having them spread evenly and continuously over all the years of undergraduate study. And the directions they should take are equally a matter for local decisions. One would imagine that the broader employment sectors (finance, business and commerce, industry, administration, communications and leisure, professions) would provide useful categories. However, it may be that more basic skills and techniques applicable across a range of sectors - computing, mathematics, management, systems analysis, human relations, social skills, communications including languages - would have more transfer and job substitution value.

The advantage of the above approach is that one can introduce a vocational element into the whole of higher education without, however, turning the whole system upside down. The introduction of a percentage of vocational courses into otherwise academic studies does not disturb the existing academic and research categories, as embodied in departments and faculties: it merely means that less time is spent on them. Thus higher education remains an academic cake, so to speak, but with some vocational icing added. The academic element is presumed to develop and guarantee the "general, deployable intelligence" of which we spoke earlier; and the vocational element provides some "expertise/trainability". If there has been some work experience as well, so much the better.

This may seem a rather conservative and pragmatic solution to such a profound problem. However, the experience of countries which have tried to alter fundamentally the academic structures of higher education - countries as different as France, Sweden and the United Kingdom - has shown that such structures are remarkably resilient, and that very often, after a period of apparent innovation, they simply reappear in a new guise(16). Universities, in particular, have a considerable ability to "absorb" reforms, perhaps because of their very long time-scale. (In the United Kingdom, until recently, the normal planning period of the universities - five years - was equivalent to the life of one government.) Moreover, the existing academic structures appear to suit other functions of higher education very well, and it is noticeable

that in Sweden the 1977 reforms are now attracting criticism of a traditionalist kind, i.e. that they discriminate overtly against bright social leavers, that they fragment studies too much, that they undermine post-graduate research. We are back to the overall problem of balancing the various functions of higher education: the "irreducible plurality" referred to earlier.

Might it be possible not merely to effect a pragmatic compromise between the academic and the vocational, but in some way to reconcile them, so that ultimately there was no conflict between them?

"All subjects are relevant", one British vice-chancellor has said. However, this argument is based on only one of the four elements which, we have suggested, employers tend to look for: the general, deployable intelligence, which in the United Kingdom tends to be known as the "trained mind" or "learning to think". Even on its own terms, this argument is open to criticism: the trained mind referred to is often conceptually refined, but mathematically primitive: critical and analytic, but not particularly original. But the argument falls down completely when faced with technical or specialised content, where specific expertise is called for; and in any case, it does not cut much ice outside the United Kingdom.

The Danish contribution to this study suggests one way of going beyond the trained mind:

> "It has often been maintained that arts graduates are already well suited for employment in new areas because they have a general ability to assimilate and analyse. This may be so, but it is proving difficult to put the claim to the test, witness the large number of unemployed.
>
> A solution in the medium term seems to lie in combining studies in the humanities with more applied elements from other faculties or institutions. It is no solution for the universities to copy whole studies that are well established at other institutions: the basis must be humanistic studies with a considerable degree of assimilation of a traditional academic area, its formulation of problems, and its methods.
>
> An example to show what can be effectuated immediately (and is in fact being considered at the moment): there exists a degree in business administration which is obtained after 4 years of part-time study. The programme can be restructured into full-time studies lasting a maximum of 2 years. Whether this is done or nor, the programme can be combined with existing programmes in the humanities without impairing their academic level. It is thus possible to give students both a traditional humanistic type of training and a degree with a high standing in the private sector.

> Other cross-faculty combinations will take more ingenuity to establish, but the principle as such should be transferable to a wider field. It would be of particular interest to involve such areas as engineering. Combinations that prove particularly successful could be developed into more integrated studies of a general vocational nature. Ideally, periods of practical work should be incorporated(17).

The paper goes on to stress the importance of trying to integrate the academic and the practical, as distinct from merely juxtaposing them:

> "We have presented the themes of 'combined degrees' and 'new groups of students' as two possible measures in the arts' faculties fight for survival. They have not been selected simply with an eye to their effectiveness in this respect. Neither are they two arbitrary examples. They are in fact two prongs of the same strategy. Moreover, they are to some extent mirror images of each other: In (a) a basically humanistic, academic type of education is combined with elements from other fields, often of an applied nature. In (b) a strictly vocational type of education is combined (after work experience) with academic/humanistic elements. What is described, then, are two paths leading to the same goal: an integration of the academic and the practical and a breakdown of the barrier between the humanities and other fields of learning(18)."

In the corresponding paper on reform of studies in the United Kingdom, it is argued that greater breadth of undergraduate studies is desirable both on employment and educational grounds. A broader education allows graduates to be more flexible in the jobs they apply for, and in subsequent career development. And a broader education avoids premature specialisation, which has high opportunity costs in educational terms, often, in the United Kingdom, cutting out subjects from the age of thirteen or fourteen onwards. It is argued that the higher the proportion of the age-group graduating, in any country, the higher the appropriate proportion of generalists to specialists. Thus, the graduate output of a relatively small, elite system of higher education can be absorbed by a comparatively small, and rather restricted job market (e.g. medical and legal professions, scientific research, teaching, elite bureaucracy). The much larger graduate output of a mass higher education system is absorbed by a much wider range of jobs which often require general intelligence and knowledge rather than highly specialised expertise (lower level public service and teaching, business and industry, service sector employment). Moreover, the graduates in these less specialised jobs are more likely to change jobs and careers than the professional specialist. The transition from elite to mass higher education therefore has curricular and employment implications, as well as implications for access.

In the United Kingdom, the broader Scottish first degree pattern might therefore be preferred to the highly specialised English "honours" degree: a view which Lord Robbins, writing seventeen years after his famour report, holds strongly(19):

> "It is quite absurd that young persons at the tender age of fourteen or fifteen should be asked to choose whether they want to be humanistic or scientists - or much worse still "social scientists". And it is equally absurd that so large a proportion of the enlarged university population should be taking highly specialised first degree courses, only directly suitable for future careers as university teachers or branches of extreme expertise(20)."

However, it is one thing to call for a broad, general undergraduate education, either on employment or educational grounds, but quite another to say how and why the various elements of that general education relate to one another, and in particular to say what role the humanities and social sciences might play within such a general scheme.

At a minimum, one can argue that to study any two (or more) subjects at least encourages a sense of disciplinary relativities, and avoids producing the kind of academic pre-Copernican who is convinced that his own subject is at the centre of the intellectual universe. The mere contrast between subjects, and the micro-cultures associated with them, can be illuminating. Clearly, advanced study necessitates specialisation: one has to narrow ones scope in order to achieve depth. Specialisation is the ground of research. However, specialisation also weakens higher education because it means that while departments embody academic specialisms, the university (or polytechnic) embodies nothing as a whole. Indeed, the university, far from having a general purpose or ethos merely becomes a mechanism for regulating competition between departments. In policy terms, one can defend the value of particular departments, but not of the institution as a whole; and this allows governments to be extremely selective in their support for higher education. We would suggest that an appropriate general aim for higher education would be to instil in all students, regardless of their specialism, a grasp of the relativity of our different modes of understanding the world. This would allow all specialists to place their specialism in perspective, and would help them to understand the points of view of other specialists; things that are surely desirable on both academic, intellectual grounds, and on practical, occupational grounds.

Beyond this rather general justification, the argument becomes much more difficult and speculative. In the English-speaking countries, and in the United States in particular, there is a strong belief that the humanities humanise: that they are the repository of humane values. Historically, there is some truth in this, since Renaissance humanism was to some extent based on a rediscovery of and

development of humanities disciplines. But it is a more difficult argument to sustain today. If the humanities develop empathy, then one can equally argue that the sciences develop objectivity. If the humanist is concerned with values in general, the technologist has to make professional judgements in many of his day-to-day decisions. And it has yet to be shown that people nurtured on philosophy or music are necessarily any less indifferent to human suffering than mathematicians or biologists. Perhaps subjects like literature, fine art and music provide a descriptive phenomenology which is not very different, in intention, from the empirical descriptions of science.

A stronger case for the humanities and social sciences can perhaps be made by reference to the central role of language in all but a few of them. Language pervades our lives, therefore anything which sharpens or illuminates our sense of language has, arguably, a general justification in any scheme to study. However, this is an argument which tends to split the humanities from the social sciences, since humanists are often very critical of the way language is used in the social sciences.

There are perhaps three aspects of the humanities and social sciences which may help us to "place" them in a scheme of general education a general education which will also be vocationally functional. Two of these have been mentioned already: the social, and the personal elements of work.

Since most work is organised by, performed in, and consumed by, groups, its social or collective aspect is self-evident. Despite the division of labour, it is work, more than anything else, which binds us to our fellow human beings in systematic and necessary ways. And since the social sciences are concerned with the social, they would seem to have an obvious part to play in any general education, vocational or not. This does not mean that everyone has to study industrial psychology, or contemporary social policy; anthropology, law and even history are also concerned with groups, though more obliquely. Literature can also give us insights into the social, though that is not its only value, by any means.

Secondly, work has a personal aspect: it affects a person's self-concept and role perception, and thereby influences his sense of identity and personal meanings: his life-world (Lebenswelt, le vécu). It is precisely in literature, and some areas of philosophy, that one finds the most accessible treatment of these themes; in, above all, the novel and the drama. For example, the deadening routinisation of much twentieth-century work has been powerfully portrayed in modern novels and films.

There seems to be a prima facie case, therefore, for including some element of the social sciences and humanities in any vocationally-oriented course, in order to open up the personal and social aspects of employment. But what about these

arts subjects which, although they may have personal or social content, seem to justify themselves ultimately in terms of the aesthetic? What place, if any, have music and painting and dance and poetry in a course that is supposedly vocational?

We are in no position here to start reviewing the various attempts in aesthetic theory, from Aristotle onwards, to demonstrate the functionality of art. However, it may be useful to make just one point, in relation to our previous discussion. It was suggested that employers expect graduates to have, among other things, a critical, analytic mind; indeed the Advisory Group spoke of the "critical functions of higher education". In the aesthetic, there is a subtle blend of the critical and the receptive, the analytic and the responsive. The "negative capability" of which the poet Keats spoke is perhaps not very different from the kind of passivity identified by the great French scientist Poincaré as one element in the creative process; or indeed from the cognitive style of "field-dependence" researched so thoroughly by the American psychologist Witkin(21). Receptivity and responsiveness, for which the aesthetic may provide some work training, may have a certain functional value in both problem-solving and work relationships, and indeed Witkin has strongly related this cognitive style dimension to career choice.

It is possible, therefore, to advance arguments which suggest that the humanities and social sciences have their place not only in any scheme of general education, but of general vocational education; and in so doing, to begin to reconcile the general and the vocational. There has not been the space here to present these arguments with the sublety and documentation that they deserve: that would require a much longer text. However, enough has been said, hopefully, to show that there are two alternatives: namely, a pragmatic balancing or juxtaposing of the academic and the vocational; and a much more theoretically ambitious reconciling of the two. If the first seems more amenable to short-term action, that does not necessarily preclude longer-term moves towards the second. In both cases, however, the academic traditions and structures of the country concerned will play a major part in determining what kinds of developments are possible. We have here been discussing the very core of higher education, namely the content of studies, and their possible reform. The potential value of any such reforms must be set against the likely costs, not only in financial terms, but in terms of the other functions or purposes of higher education. We come back, in a word, to the problem of balance.

VI. CONCLUSIONS

Finally, we shall summarise the main conclusions and policy recommendations of this paper. For the sake of brevity and clarity, these will be re-stated simply, without the qualifications which appear in the main text, and without reference to specific national differences.

In most OECD Member countries, higher education is currently on the defensive, for four main reasons: economic recession, demographic changes, graduate unemployment, and the belief that the system over-expanded in the 1960s and 1970s. The strength of these reasons varies from country to country; and all of them are open to dispute.

There is some reason that these problems will be interpreted by policy-makers in terms of the size of the system, and that the (to some extent) generalised expansion of the 1960s will now be paralleled by a generalised contraction in the 1980s. While it is reasonable to expect higher education to reflect changes in economic and demographic variables up to a point, in the longer term, the type and flexibility of higher education systems are more important than their exact size.

By type, we mean the kind of graduates higher education produces, what they have studied, and to what extent they are generalists or specialists. The curriculum of higher education - the content of studies - therefore becomes of prime importance. (The problems of flexibility go beyond the scope of this paper, but obviously are related to staffing and allocation of posts.)

Higher education systems have a plurality of aims and functions, and their curricula should reflect this plurality. This means that employment relevance must be included, as one function among others, in the planning of courses. However, employment relevance, or reference to "working life" is by no means as narrow or specific as might be assumed, and involves not only an emphasis on the transfer of learning (to encourage flexibility and adaptability) but also includes the social and personal aspects of employment.

Higher education can respond to a greater emphasis on working life in five main ways. First, the alternative between work and study, either before, during or after studies, can be encouraged. Not only might this help to relate the content of courses to working problems, but it may give graduates a better understanding of the personal and social aspects of employment.

Secondly, vocational representatives can be involved in the planning or accreditation of courses, or in institutional or even system planning and policy-making. This already happens in a number of countries, particularly in relation to "professional" subjects. However, such a development reduces the "autonomy" of higher education.

Thirdly, the numbers of students on vocational courses (or in vocational institutions) can be increased, and the numbers on non-vocational courses (or courses leading to oversubscribed vocations) decreased. This can be achieved either through planning, or a shift in demand, or a mixture of the two. As a short-term adjustment mechanism, this has a good deal to recommend it, but because of forecasting and time-lag

difficulties, it can also lead to concurrent manpower gluts and shortages. It can also create imbalances within the higher education system, which then have to be corrected at a later date, when the employment situation changes again.

Fourthly, a pragmatic compromise between academic and vocational needs can be struck by, for example, requiring all students on academic courses to spend 20 per cent of their time on vocational studies. This leaves conventional academic structures largely in place, while equipping students with some marketable employment skills. The vocational courses can be organised either in terms of broad sectors of employment, or basic skills and techniques which are useful in a number of sectors. Local, and immediate, employment factors will influence the planning of such courses strongly.

Fifthly, one can attempt to reconcile academic and vocational needs by subsuming both within a framework of general, undergraduate education. The humanities and social sciences would have their roles within such a scheme, which would necessarily be cross-faculty. The basis for such a general vocational education is not easy to formulate, but arguments can be advanced for the inclusion of even apparently "non-vocational" elements. The advantages of such a general approach are that it is flexible, and multi-purpose in employment terms, and ensures a balanced development of the higher education system, by involving all faculties fairly equally.

A paper like this, which discusses general criteria and issues, and draws on the experience of a number of countries, is bound to be relatively abstract. We can do no more here than outline the five main policy options which we perceive: the choice between, or combinations of these options is largely determined by national circumstances and traditions. In some countries, for example, it would be anathema to academic staff to involve outsiders in course planning; in other countries it is already established practice. The vocational function of the universities is emphasized more in some countries than others, and always has been. The humanities and social sciences are much more of a special problem in some countries than others. In short, the generalisations of the paper need at every turn to be qualified by national considerations.

However, despite such national variations, it is worth making one final, general point. There is always a danger in writing a paper of the type "Higher Education and . . ." that the function or aspect thus isolated (in this case, Working Life) expands and develops to the point where all the other aspects of higher education recede and diminish, and the overall perspective is lost. This problem could equally arise in a paper on "Higher Education and Research Priorities", or "Higher Education and Student Demand".

The main purpose of this paper has been to establish vocational factors not as an over-riding consideration in the content of studies, but as one consideration among others. In retrospect, much of the expansion of the 1960s appears imbalanced. The Robbins Report in the United Kingdom, for example, acknowledged the plurality of higher education's functions, but then went on to plan almost entirely on the basis of student demand. Explicitly, or implicitly, this happened in many other countries. However, it would simply compound the problem now to have an opposite swing towards vocationalism. The long-term development of higher education is not well served by violent lurches in any direction, or, for that matter, by violent expansions or contractions. The continuity of research, the meeting of manpower needs, the satisfaction of student demands and the internal management of higher education are best assured by an even-handed approach which acknowledges the plurality of higher education's functions, and the need to strike the appropriate balance between them.

Notes and References

(1) Summary conclusions fo the first meeting of the Advisory Group of National Representatives, OECD, Paris, 1980, (mimeo) para. 9.

(2) Ibid.

(3) list of contributions dealing with national developments:
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  (ii) Germany* Ruge, R., "Higher Education in Germany: an attempt at qualitative and employment-oriented reforms." OECD, Paris, 1981 (mimeo)
  (iii) Sweden* Bladh, A., "Humanities and Social Sciences in the 1980s: the case of Sweden." OECD, Paris, 1981 (mimeo)
  (iv) United Kingdom: Squires, G., "Higher Education and Working Life: reform of studies in the United Kingdom." OECD, Paris, 1981 (mimeo)
  *) denotes national contribution.

(4) Advisory Group, op. cit., para. 8.

(5) Bladh, A., op. cit., p. 2.

(6) Squires, G., op. cit., p. 17.

(7) Larsen, F., "Post-Secondary Education and the Impact of Labour Market Prospects: report on a meeting of trade union and management experts held at the OECD on 24th-26th November", para. 53, OECD, Paris, 1980 (mimeo)

(8) Squires, G., op. cit.

(9) Larsen, F., op. cit., paras. 62, 76.

(10) Larsen, F., op. cit., p. 8.

(11) Bladh A., op. cit., p. 3.

(12) "Employment prospects for higher education graduates." Report by the Secretariat, p. 27 et sq. OECD, Paris, 1981

(13) "Development of Post-Secondary Education in OECD Countries since 1965", OECD, Paris, 1979, (mimeo) p. 45.

(14) Bladh, A., op. cit., p. 1.

(15) Ibid., p. 15.

(16) The relevant examples here are: the attempt to impose a "cycle" structure on the traditional licence in France; the attempt to organise higher education in terms of broad, vocational programmes in Sweden; and the attempt in some "new" universities in the United Kingdom to do away with subject departments.

(17) Larsen, F. op. cit., p. 13.

(18) Ibid., p. 15.

(19) Squires, G., op. cit., p. 19 et seq.

(20) Lord Robbins, Higher Education Revisited, MacMillan, London, 1980, p. 22.

(21) Witkin, H.A., and Goodenough, D.R. (1977) Field Dependence Revisited (RB-77-16) Princeton: Educational Testing Service.

PART II

THE STATE OF RESEARCH IN HIGHER EDUCATION

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The State of Research in Higher Education(1)

I. INTRODUCTION

The environment of research in higher educational institutions is formed by two quite distinct sets of public policies, reflecting the multi-functional role of such institutions in advanced societies. On the one hand are policies towards higher education itself: universities and other post-secondary institutions have their parts to play within general educational policy. This does not require emphasis, and has always been (and remains) the major claim of these institutions on public resources. On the other hand are national science and technology policies. From the point of view of those concerned with formulating and implementing these policies the higher education system is a major repository of expertise, as well as the source of research manpower needed by industrial and other social and economic institutions. In most Member countries these two policy processes have been quite separate from each other, and they remain so today. There is a danger that under the constraints of the 1980s this lack of articulation may have serious implications both for the well-being of academic institutions and for their ability properly to contribute to social and economic progress in the 1980s.

In the 1960s, a period of expansion and of affluence, this lack of articulation posed no problem. As enrolments expanded, faculties and budgets expanded. At the same time funds for scientific research became increasingly plentiful: science and technology seemed to promise much, and basic research was the hope of the future. The university was the natural home of basic research, and it was never necessary to call into question the time-honoured belief in the "essential connection" between research and teaching. In many Member countries university scientists could, if they wished, easily obtain extra research funds to procure assistants and equipment from Research Councils and similar bodies.

Continuing expansion led also to widespread experimentation in higher education, as new means of accommodating rapidly growing numbers of students were sought. It gradually became apparent that in the systems of mass post-secondary education which were envisaged it would not be possible for all teachers to engage in research along traditional university lines. Some began to consider whether the benefits which research was thought to confer on teaching (the basis of the "essential connection") could be obtained in other ways. Various experiments were tried, including student-initiated research as a pedagogic device(2). On the

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(1) This paper makes extensive use of work carried out under the auspices of the Committee for Scientific and Technological Policy, and especially the report The Future of University Research (OECD 1981).

(2) See Structure of Studies and Place of Research in Mass Higher Education (OECD 1974).

other hand it was difficult to restrain the aspirations of newly created non-university institutions of higher education to engage in "traditional" research, for it seemed that commitment to such research was the real basis of academic status. Research began to diffuse through the higher education system, in some countries facilitated by special measures designed to promote institutional or regional development.

By the mid-1970s the very different situation which OECD countries face today was becoming visible. In most countries student enrolments grew at a very much slower rate and then gradually ceased to grow at all. The economic recession which set in, and resulting attempts to restrain the growth of public expenditure, impacted both on higher education budgets and funds for research. A series of adverse factors came together, so that as the situation deteriorated some began to speak of a "crisis" in academic research.

This paper discusses some aspects of the present situation. There is no doubt that a significant deterioration has taken place which poses major problems for higher educational policy both at the national and the institutional level. Moreover at the beginning of the 1980s these problems suddenly acquire a new saliency. Important developments are now taking place in science and technology policies which, once more, have major significance for higher education systems. Many Member governments are coming to accept that research-based industrial innovation must form an important part of a strategy to escape from the present recession. New technological opportunities must be sought, and maximum use made of available new technologies such as microelectronics. At the same time new kinds of values, often articulated by community groups or trades unions are resulting in new kinds of demands of the scientific system. These changing social values lead to demands for research directed at "clean technologies", or non-labour shedding technological change, or multi-disciplinary studies of local community problems. Various new demands are being made on the higher education system, particularly in research. Crucial questions surround the ability of the system to respond, after some years of decline. Policy-makers cannot avoid these questions, but to begin to address them is inevitably to probe more deeply into the legacy of the past decade.

II. THE CURRENT STATE OF ACADEMIC RESEARCH

The situation of research in the higher education system is determined by higher educational policies (and demographic factors) on the one hand, and by science and technology policies on the other. Although the relative impact of these two sets of policies differs from one Member country to another (partly because of different ratios of internal and outside project funds in research support) this interaction is crucial everywhere. It is useful to distinguish these two sets of influences, for they raise somewhat different issues for policy-makers.

(i) The Effects of Higher Education Policies

The crucial factor here is the succession of periods of rapid growth in enrolment, low growth, and then stagnation: a situation unlikely, at least on demographic grounds, to reverse itself before the late 1980s. These changes in enrolment affect research in four quite different ways.

(a) Student numbers are the main determinant of higher education budgets, so that as numbers have levelled off, so have the incomes of higher educational institutions. In fact budgets, when corrected for inflation, seem not quite to have kept up with the slow expansion of the mid-1970s. When salaries are paid, and teaching material provided, money left over for research has thus declined. Also, as students increasingly chose the social sciences rather than the natural sciences or technologies, there was a consequent shift of resources between fields.

(b) Changing enrolments determine recruitment of new faculty members. In the 1960s expansion led to rapid recruitment. Many young scientists were appointed to senior posts in new institutions and to new posts in old institutions. The subsequent end to recruitment has led to a general ageing of academic staff. There are few or no promotion prospects for those in junior posts, and no employment prospects at all for those seeking an academic career.

(c) This has discouraged students, and worryingly perhaps the best students, from embarking on post-graduate studies. Post-graduate students in many OECD countries have largely been supported financially from project grants to senior scientists. Diminishing grants have meant less assistantships of this kind. The employment market for scientists in industry, too, has looked unattractive as industry has cut back on its research. These factors together seem to have led to significant decline in the scale of post-graduate work.

(d) This decline has been hastened too by an evolution in the composition of the student body from which research students are drawn. Measures taken to increase the access of students from less privileged backgrounds, as well as of students with work experience, have resulted in significant numbers of students who are less likely to embark on research study after graduation.

(ii) The Effects of Science Policies

The significant factor here is the way in which external funds for research projects (sometimes called "second and third flows of funds") are distributed. Three tendencies can be identified.

(a) Although the balance between research support from normal institutional funds and research support from external funds differs greatly from one country to another, the tendency is towards relative growth of the latter. Thus research funds from Research Councils on the one hand and from Ministries or other sectoral bodies on the other are of growing importance. It is also apparent that Research Councils are gradually abandoning their traditional laissez faire approach for more interventionist methods. That is, they are increasingly establishing their own priorities in research, and reserving funds for these, as well as seeking to bring about co-operation between disciplines, institutions and social sectors.

(b) Bodies financing research from public funds have been under growing pressures to ensure that their resources are used as effectively as possible. The view has gained ground that research in many fields (not just those demanding major facilities like radio telescopes) is most effectively concentrated in big groups, which is also supposed to reduce duplication of effort. There have thus been attempts at concentrating resources for research in "centres of excellence".

(c) The criteria on which funds are allocated to research projects have also been changing. In particular the emphasis on research being "relevant" (to some national objective of social or economic policy) has greatly increased. This has sometimes taken the form of broadly defined national programmes towards which research should become oriented. Sometimes it has taken the form of increasingly restricting research funds to support for specific projects judged to be of immediate practical relevance for some short-term objective.

How have these two sets of policy developments interacted, and how have they affected the research activity of higher educational institutions? In what sense is there a crisis? Among the clearly visible consequences, to which policy-makers must address themselves, are the following.

First, the decline in post-graduate training must be noted. Research training fulfils a number of distinct and important functions, and any decline must be judged in relation to each. First, there is the question of the supply of research manpower in relation to the future needs of the economy and society. How adequate are numbers now being trained in relation to future manpower demands? Second, consideration must be given to whether or not the pool from which new faculty will be recruited when enrolments begin once more to grow is adequate in both quantity and quality. Third, it must be borne in mind that in the laboratory subjects in particular it is post-graduate students who do most of the practical work of research. A decline in numbers may have

affected the research effectiveness of academic departments. Fourth, post-graduate students also tend to have a major role in supervising the practical work of undergraduate students, thus contributing to teaching effectiveness too. This also may have been affected.

The ageing of academic staff is also a matter for concern. The possible consequences are various. In the first place there is an inevitable effect on the costs of higher education. An ageing faculty almost inevitably implies a growing wage bill, even apart from the effects of inflation. A growing proportion of the total income is taken up by wages and salaries, thus leaving a smaller proportion for research. It has also been suggested that as scientists, and research groups, age, their research competence and productivity begins to diminish. Similarly, it seems likely that as they grow older the willingness of scientists to change their research interests - and indeed their ability to do so - in line with changing scientific priorities and scientific advances also declines.

There is evidence for growing obsolescence in the scientific equipment available for research in higher educational institutions (shown by declining capital expenditure per scientist). This may mean that scientists are less able to carry out research at the forefront of knowledge. It may mean that their research is increasingly directed into fields requiring less sophisticated or costly equipment. It is possible that some of the effects of this trend can be mitigated by increasingly providing equipment on a co-operative basis, to be shared between departments or institutions. But the various possible effects of such a strategy remain to be elucidated. An equivalent problem faces the social sciences and humanities, as a result of declining funds available to libraries, and for travel necessary where source material located elsewhere has to be consulted. Again, it may be that research is becoming less effective, or that scientists are necessarily selecting different topics for study.

What are the effects of growing dependence upon external project funds for research? One possibility is that academic research is becoming more useful to society: that a major resource of talented and expert men and women are now being more effectively mobilised in a concerted attack on the problems facing all Member countries today. Enlightened science policy could mean that this is indeed the case. But it is also possible that higher educational institutions are being turned into centres primarily of short-term and applied research. It is questionable whether such a transformation would represent a proper use of their expertise, or indeed the contribution which they can best make to future social and economic progress. Moreover, funds of this kind, and especially those coming from mission-oriented (sectoral) bodies, are necessarily more concentrated in some fields than in others. The effects of this upon the balance of the academic curriculum must be borne in mid. So too must the

possibly disruptive effects of growing disparities in resources between academic departments upon the structure of the institution. Finally, the possible implications of academic institutions largely losing control of their own development must be considered. Growing imbalance in funds available, as mission-oriented agencies concentrate support in applied fields deemed immediately useful, may have other consequences. There is the danger that fundamental research will suffer in particular. It is difficult at times of financial stringency to make a strong case for continuing support for fundamental research. Attempts to demonstrate its economic value in quantitative terms have not, on the whole, been successful. Few governments have been convinced of the benefits of maintaining support for research projects judged worthwhile only in scientific terms, whilst cutting back on total support. Industry too has responded to the economic crisis by cutting back on research, and in those countries where there was some support for fundamental research in the universities, this has generally been an early industrial economy.

In a number of countries the social sciences and humanities are facing similar problems as a result of current emphasis on short-term utility. Again, many research funding agencies are failing to maintain levels of support for these fields. Moreover the social sciences and humanities are at risk in other ways. It is not at all clear that they are entirely suited to the project funding mode of support which seems to be gaining ground. Much such research is only carved up into discrete "projects" at considerable cost to its coherence and ultimate quality. It may well be that much work in these fields is better supported through the traditional medium of general university funds. But there is a "Catch 22" situation, since it is these fields precisely which are being denuded of funds as students increasingly choose subject with some vocational element.

The problems listed above are not intractable. Although they are present in greater or lesser degrees in almost all OECD countries, there is no doubt that remedial action could readily be taken, given commitment by relevant authorities. What must be considered, however, is whether a decade of decline along these various dimensions may also have given rise to more deeply rooted changes which cannot be dealt with simply by an injection of new resources.

III. THE CONSEQUENCES OF DECLINE

It is less clear what form any more deeply rooted changes may have taken, but it is likely that they have been of two kinds: individual and structural. At an individual level, it must be recognised that academic scientists in many countries have become profoundly demoralised. Whilst it is not easy to understand what the consequences of a long period of declining research possibilities may have been, two likely consequences require consideration. In the first place the situation must appear as one in which the value which society

seems to place on the work of the academic scientist - as reflected in the resources which it makes available to him - has progressively fallen. This cannot have been without psychological effect. In the second place it must be recalled just how central a place the performance of research occupies in the scientist's conception of his role, learned through prolonged professional training. It is through his research that he earns his place in the international community of his peers, and commitment to the advancement of knowledge is central to his personal values. The effects of then being denied the practical means of pursuing this commitment may be understood in terms of the sociological conception of 'anomie'. Sociological writing suggests that a typical protective response is a turning aside, a search for gratification in other spheres. In other words it is possible that many academic scientists are disengaging from research: ceasing to regard themselves as researchers. If this is so, and there is slight evidence for it in some places, the effects need to be understood.

Aside from these individual consequences, prolonged decline in academic research, accompanied by the other tendencies noted earlier, might also have certain structural consequences. Perhaps the most important of these is a decreasing flexibility within the academic system. The importance of this, if it is indeed the case, is that the higher education system will be less and less able to respond to new challenges and new opportunities. Yet there are a number of reasons for fearing that such may be the case. Ageing is an important fact, for as already mentioned as scientists grow older they are less able and less willing to change their research interests. At the same time they are less willing to move physically. This combined with the lack of new posts has meant that there is now virtually no institutional mobility. Academic institutes and departments are less and less exposed to the essential influx of new thought, new ideas, essential to truly original research. This being the case, how is multidisciplinary research to be initiated: the very research necessary if current problems (such as the energy crisis) are to be tackled? An additional factor making for rigidity, non-responsiveness in research, is employment protection legislation. Laws introduced with the well-being of workers generally in mind has had unanticipated consequences for academic research. Higher educational institutions in a number of Member countries are becoming reluctant to accept research assistants and technicians paid from external grants for fear that they may subsequently be obliged to offer permanent employment, and without the financial resources to do so. Have rigidities of this kind set in, and if so what might be done?

A second structural effect which investigation may diagnose is growing institutional stratification. Hitherto in a number of countries the tendency to concentrate research resources in a limited number of academic nstitutions has been largely held in check. That is, although research funding bodies have felt that effectiveness would be improved by greater

concentration in "centres of excellence", they have been constrained by the legitimate desires of newer institutions to build themselves up. As this constraint is removed, what will the effect be? One possibility is a growing differentiation between research-performing and purely teaching institutions. A second possibility is that each institution will be a "centre of excellence" in one or two fields, so that there will be a clear differentiation between rich and poor fields within the institution. What might the implications of such a development be?

(iii) Responses

Although action taken by Member governments, and to some extent by academic institutions themselves, does not match the seriousness of the situation described, yet some steps have been taken. For example, in a few countries (e.g. Canada, Finland, Italy) there is a recent commitment to the "re-financing", or "re-capitalisation" of university research. Although the advantages, and the appropriateness of making a fund available for the replacement of obsolete equipment are undeniable, the problem is not solely one of extra financial resources. Much depends upon the procedures by which, and the purposes for which, money is made available. It is worth considering the more general applicability of certain measures introduced in a number of countries.

Thus, there is no doubt of the serious effects on research of lack of recruitment. As pointed out above, this has had a number of effects: it has discouraged some of the most able students from embarking on post-graduate work; it has made it very difficult to initiate new topics of research, and so on. But given the fact that enrolments in most Member countries are unlikely, at least on the basis of demographic trends, to expand before the end of the decade, it is difficult to see how additional posts could be justified. One possibility may therefore be the creation of substantial numbers of temporary posts in higher education, at the post-doctoral level. This is the purpose of the Heisenberg Programme in Germany, in which scholars are selected extremely rigorously on the basis of research potential and offered a five-year appointment. The programme covers all fields of science and scholarship. It is nevertheless controversial (because of its acknowledgedly elitist character), and moreover it is proving difficult to find a sufficient number of young scientists of high calibre. It seems possible that the lack of permanency makes the positions unattractive, despite the considerable research opportunity offered. Nevertheless this scheme, and others being tried elsewhere, merit more general consideration, for it addresses itself to a crucial issue. How can "new blood" be brought into academic research (essential for its continuing vitality and for the requirements of emerging lines of research) if there is to be no permanent recruitment for 5 to 10 years? And how can some guarantee be secured that when new academic staff are eventually sought there will be adequate numbers of suitably talented and trained people on whom to draw?

Reference has already been made to the erosion of the funds which higher educational institutions can make available for research from their normal operating budgets. A number of Member countries (such as the Netherlands and Sweden) are attempting to protect the research element of academic budgets by "decoupling" the research and teaching elements in basic funding. Such a separation can break the direct financial influence of varying undergraduate admissions on research, and thus give research activity a more independent and potentially more stable existence. The general applicability of such measures in other Member countries merit consideration. However it must be recognised that such an approach represents a very clear rejection of the idea of the inseparability of research and teaching. It could lead to a much clearer functional and social separation of the two activities. This in turn raises the danger that if many teachers were effectively barred from research, then many students would be denied contact with the fructifying effects of original research and would become still less interested in pursuing research training. Perhaps still more seriously, there is at least the possibility that, denied contact with research activity, curricula in many departments or institutions would ossify and cease to develop (even to the extent which is now the case) in line with advancing knowledge. Some also believe that any further separation of research from teaching would lead to still more rigid stratification in the academic system: first and second class institutions, first and second class staff. And of course it is possible that higher educational institutions would become still more dependent upon government priorities in research, still more at the mercy of short-term concerns and fluctuations. It seems that an essential parallel to any procedures or initiatives of this kind is the development of more coherent planning of research priorities by higher educational institutions themselves.

Such planning seems essential if some of the benefits of at least partial decoupling of research rom teaching are to be secured whilst the worst dangers are avoided. This is indeed being attempted in a number of Member countries, in some if not all higher educational institutions. But the establishment of research priorities is not an accustomed task for such institutions and whilst it seems to imply a valuable concern for a measure of self-determination, there is the undoubted problem of how it is to be done. It may, for example, require a strengthening of the central authority at the expense of traditional departments or institutes. It will be necessary to decide whether any institutional research committee should have the responsibility for allocating the research funds available to the institution (whether or not these have been decoupled previously) and if so on what criteria. If there are to be procedures of this kind, then it will need to be considered whether a single institution possesses the breadth of expertise to make objective judgements of scientific excellence across all the fields of science. Once more there are potential dangers for social sciences and humanities in such an extension of "project support" to internal funds. There is the question

of whether such a research committee should have the right to approve all applications by faculty members to outside sources of research funds: a considerable erosion of traditional independence. Whilst difficult issues of these kinds are inevitably posed, the desirability of institutional planning of this kind is increasingly being debated. It seems to be a valid response to some of the difficulties enumerated in this paper, and thus to merit still wider discussion in the light of specific characteristics and traditions of individual Member countries.

These are a few attempts, and they are few, at accommodating to the situation in which higher education institutions now find themselves in respect of their research. How generally applicable are they, and how adequate? What other possibilities exist? How should any new resources best be deployed, and what can be achieved by better use of existing resources?

To pose these questions is to raise once more the traditional lack of articulation between higher educational and scientific policies. For a "better use of existing resources" necessarily depends upon the reconciliation of differing policy objectives at the national level. Science policy bodies have tended to think in terms of "efficiency" and "rationalisation" in research, which has led them to emphasize concentration of resources, selectivity, the avoidance of duplication. They have sought also increasingly to direct resources towards "national needs" in research. But the fact is that academic research has many functions: in respect of national research systems, economic systems, social systems, educational and cultural systems, and so on. The optimum use of resources cannot be decided in the light of one function, one objective, alone. The crucial question of how national science and higher educational policies can more adequately be articulated with each other demands consideration.

IV. THE IMPLICATIONS OF CURRENT TRENDS IN SCIENCE AND TECHNOLOGY POLICY

The final set of issues which require consideration give added importance, and indeed urgency, to all that has gone before.

There seems little doubt that the economic crisis which the Members of OECD have faced over the past few years will continue to be at the top of the policy-agenda for some years to come. Traditional methods of economic management are seemingly inadequate to the combination of inflation, unemployment, no growth, energy and raw materials shortages which the industrialised world currently faces. In many OECD countries traditional industries are now faced with a challenge from newly industrialising countries which they will be unable to meet in a competition based on price alone. There is growing agreement that a new economic strategy is required, and that within such a strategy industrial innovation must have a major place. Innovation would be directed towards those

industries based on sophisticated new technology where the advanced OECD countries may find a secure base for exports and production in the new economic order. The strategy involves embracing the most advanced microelectronic techniques in production and other areas of the economy (whilst recognising, and taking steps to mitigate, the social effects this will have). It also involves a major commitment to industrially-oriented, and industry-performed, basic and strategic research. New technological opportunities must be sought, involving perhaps bio-technology and other technologies of general application (so-called "generic technologies") for there is the possibility that from these may come wholly new job-producing industries.

This strategy will present major challenges to higher education systems, not least to their capacities in research. The vital question is: how can they best contribute in bringing about the success of such an attempt to meet the challenge which OECD governments, and societies, now face? From this question flow a number of topics which require careful consideration.

What seems to be needed for industrial regeneration is a major investment in "strategic" research: that is, research addressed neither to problems of immediate short-term policy relevance nor to problems which derive their interest only from theory. Strategic research is that which lies between the two, seeking to be truly innovative but in areas having a general relevance to the problems of today. It is here that academic institutions could undoubtedly make a major contribution. But how can their research support be enlisted in this way? How can a middle ground be steered between research of purely scientific interest on the one hand and research of no more than short-term industrial interest on the other?

It may be, for example, that new kinds of links between academic institutions and industry are required, to facilitate knowledge transfer. Such links might perhaps entail innovative approaches to research training: a new kind of partnership at the post-graduate level in which responsibility for advanced training is shared (such as has been attempted in the United Kingdom in recent years).

It seems clear that many of the technological opportunities which will have to be identified and pursued will involve new mixes of skills. Bio-technology is an example: a field in which research necessarily involves the skills of chemical engineers, geneticists, microbiologists, and a variety of other specialisms. There is no doubt that higher educational institutions have an important part to play. This is not only because they possess the mix of relevant skills (though often not the means of bringing them together), but because the training of new generations of researchers to staff new industrial laboratories will be crucial. However in few countries are academic structures and funding mechanisms flexible enough to encourage the formation of such multidisciplinary groups. Indeed it may be that such

flexibility is in fact diminishing, for reasons which have been discussed. Steps need to be taken if the initiation of such multidisciplinary research is to be facilitated. But the problem is not merely one of initiation. Research of this kind will require guaranteed funding for some years ahead if it is to progress. At a time when budgetary constraints seem to inhibit long-term financial commitments, ways will nevertheless have to be found of providing such guarantees.

To some extent identified fields of technological opportunity must - and do - reflect changing social values and aspirations: the greater emphasis now put on improved health, environmental quality, conditions of work. It is true that such aspirations have had to some extent be held in abeyance during the economic crisis, but the underlying values are undoubtedly still present. In some countries it has been recognised that they can indeed provide the basis for economic opportunity: as in development of "clean technologies", solar and geothermal energy technologies, and so on. Much such research requires the involvement of social, scientific as well as natural and technological science expertise.

Moreover there are major problems of social adjustment which are as yet little understood. What will be the effect on the individual, and on community and family structures, of continuing high levels of unemployment? What are the implications of inequalities in the extent of unemployment between regions and age groups? What might the effects of microprocessors be, not only on overall levels of employment, but (through e.g. new communications technologies) on social structures and cultures also? The answers to crucial problems like these, and the current situation of Member countries suggests many like them, necessitates involvement of the social sciences on a growing scale. Much of the relevant expertise is located in the higher education sector.

Legitimate pressures will continue to be exercised upon higher educational institutions to play their part in an innovation-based economic strategy. Only if higher educational institutions themselves, and higher education policy-makers at the national level play an active role in defining this contribution, in consultation with science and technology policy-makers, will the benefits be maximised and the dangers avoided.

But the current situation poses special intellectual problems for the social sciences and humanities, for many established ways of understanding (e.g. certain economic theories) are proving of little value. The 1980s are a decade of uncertainty. It is not only that governments face difficulties in framing effective policies, it is also that individuals and societies have to learn to cope with major transformations in, for example, females roles and identities, the aspirations of ethnic and cultural minorities, the changing place of paid work in the life-cycle, and the changing international balance of economic and political power. It is

almost certainly the case that it is not through "crash programmes", or two year projects, that the higher education system can best aid society in its difficult and uncertain task. It is through traditional scholarship made more widely available.